

SEROUS OTITIS MEDIA: A RATIONALE FOR THERAPY*

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SEROUS otitis media is common in otologic and pediatric practice, yet, despite years of cumulative experience in diagnosis and treatment and despite extensive clinical and laboratory investigation, controversy surrounds many aspects of the disease. Divergence of opinion begins with basic terminology. The Ad Hoc Committee on the Classification of Otitis Media and Otitis Media with Effusion¹ has suggested a unified system of categorization (Table I). The term "otitis media" defines an inflammation of the middle ear cleft. A distinction is made between otitis media with serous or mucoid effusion (serous otitis media) and otitis media with purulent effusion (suppurative otitis media). Further classification is delineated by the duration of the disease and the integrity of the tympanic membrane.

This paper deals with otitis media with effusion serous or mucoid and with an intact tympanic membrane, simply termed serous otitis media.

PATHOPHYSIOLOGY

Eustachian tube dysfunction is the usual cause of serous otitis media. The term "dysfunction" bears emphasis. It is commonly said that the key etiologic factor is eustachian tube obstruction. More accurately, physiologic dysfunction leads to functional obstruction.

Table II summarizes the pathophysiologic factors associated with eustachian tube dysfunction. Mucosal disease, regardless of etiology, heads the

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TABLE I. CLASSIFICATION OF OTITIS MEDIA

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- 1) Otitis media without effusion or perforation of the tympanic membrane
 - 2) Otitis media with effusion, without perforation of the tympanic membrane
 - a) Acute (0 to 3 weeks) serous, purulent
 - b) Subacute (4 to 12 weeks) serous, purulent, mucoid
 - c) Chronic (more than 12 weeks) serous, purulent, mucoid
 - 3) Otitis media with perforation
 - a) Acute
 - b) Subacute
 - c) Chronic
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list. Adenoidal hypertrophy and nasopharyngeal carcinoma are possible examples of direct tubal obstruction, although it has been suggested that secondary edema may play a role. Eustachian tube dysfunction in children with cleft palate, 75% of whom develop serous otitis media, has a mechanical basis. Heredity seems to be a predominant factor in Eskimos, American Indians, and children with Down's Syndrome. Recent studies have demonstrated that surfactant can be isolated from the eustachian tube, and there has been, accordingly, speculation as to the possible role of a surfactant deficiency.

Once eustachian tube dysfunction occurs, regardless of its etiology, a cycle of middle ear disease begins (see figure). The inability properly to aerate the mesotympanic space results in negative middle ear pressure because of mucosal absorption of middle ear gases. Theoretically, when this negative middle ear pressure exceeds the oncotic pressure within the mucosal microcirculation, a transudate occurs. This transudate, or the negative pressure itself, is a source of mucosal irritation and causes a secondary hypertrophy of goblet cells and transformation of pleuripotential basal mucosal cells to a secretory state.^{2,3} At this stage, the serous transudate yields to an actively secreted mucoid effusion.

The natural course of serous otitis media is often spontaneous resolution. Hypertrophied secretory cells degenerate, become inactive, and the effusion resorbs, but the incidence of recurrence is high.^{4,5}

Sequelae of persistent serous otitis media include hearing loss and chronic otitis media. These sequellae are clinically evident, although prospective documentation of precise temporal relationships is lacking. Deprivation of sound or fluctuating auditory input during the first 24 to 36

TABLE II. ETIOLOGY OF EUSTACHIAN TUBE DYSFUNCTION

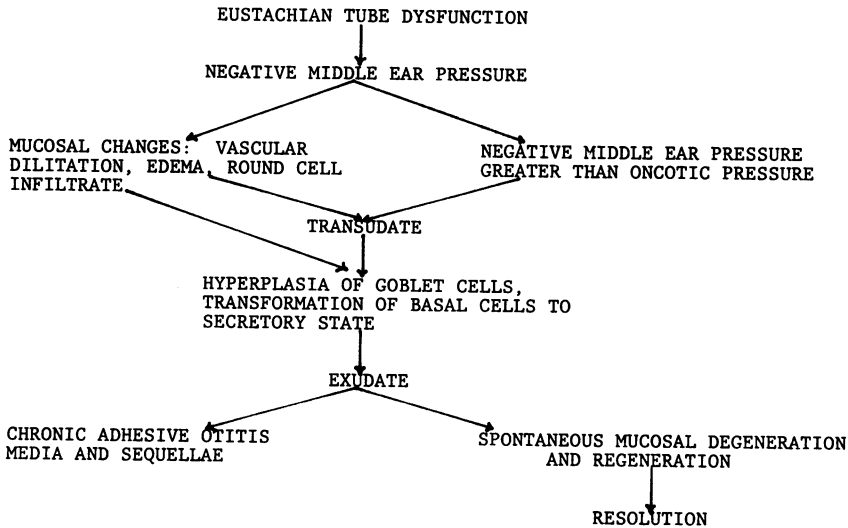
<i>Mucosal disease</i>
Viral rhinitis
Allergic rhinitis
Infectious rhinitis
Syndrome of immotile cilia
<i>Peritubal edema (? lymphedema)</i>
Adenoiditis
Tonsillitis
Sinusitis
<i>Direct obstruction</i>
Adenoid hypertrophy
Nasopharyngeal carcinoma
<i>Mechanical factors</i>
Cleft palate
<i>Hereditary factors</i>
American Indian
Eskimo
Down's syndrome
<i>? Surfactant deficiency</i>

months of life may retard development of speech and delay educational achievement.

TREATMENT

The goals of treatment of serous otitis media are the restoration of hearing and the prevention of chronic ear disease. The cornerstone of medical therapy is the use of topical and oral decongestants. Although reports appear disavowing any pharmacologic effect of such preparations on "eustachian tube function," their clinical efficacy has stood the test of time.

Antibiotics are a useful adjunct. Despite the frequent paucity of clinical findings to suggest acute suppuration, 50% of "nonsuppurative" effusions yield bacteria upon culture. Moreover, enlarged adenoids have been demonstrated to harbor pathogenic organisms.⁶



A short course of steroid therapy may also be efficacious. A well designed, double blind, placebo study⁷ evaluated 41 children with persistent serous otitis media with effusions of more than one month's duration. All children had previously been treated with antibiotics and decongestants but had failed to respond. No child was included who had any evidence of pending resolution, such as an air-fluid level or air bubbles. Twenty-four children received a prednisone-sulfa combination, and 17 children received a lactose-sulfa placebo. Sixty-three percent of the children treated with the prednisone combination resolved. Only 6% of those given lactose sulfa resolved. Of the 16 children who failed initially on lactose-sulfa combination, 81%, or 13, resolved when switched to the prednisone therapy. The dosage suggested is 1 mg./kg. per day over 7 to 10 days in a rapidly tapering dosage.

Surgical intervention is indicated in selected resistant patients. The dilemma continues to be the timing of surgery and the choice of surgical procedure. It is a reasonable clinical dictum that surgery is indicated if a child has a persistent effusion of longer than three months duration.

Recurrent suppurative otitis media is a relative indication for surgery. If a persistent serous effusion can be demonstrated between acute attacks of infection, myringotomy with tube insertion is logical. A more difficult

TABLE III

COMPLICATIONS OF MYRINGOTOMY TUBE ⁸	
<i>Complications</i>	<i>% Based on 697 ears</i>
Drainage	19.9
Chronic drainage	3.6
Repeated tubes	7.2
Perforations, total	3.1
Perforations, chronic	1.4
Retraction	1.6
Tubes in tympanum	0.1
Cholesteatoma	0.1

case is a child with recurrent bouts of infection who is perfectly normal between acute episodes. The decision to abandon medical management in such an instance is based upon relative indications: the amount of school missed due to the illness, the patient's tolerance to available chemotherapeutic agents, and the tolerance of the child's parents to recurrent illness. Once the decision has been made to operate, the controversy shifts to the indicated procedure. Will myringotomy with aspiration of fluid suffice? Is the insertion of a myringotomy tube necessary? Should adenoidectomy be performed? Is tonsillectomy indicated?

Based upon our knowledge of the pathophysiology of middle ear disease, it is logical to place a ventilating tube if there is an indication for myringotomy. The tube allows continued aeration of the middle ear cleft while allowing resolution of reversible mucosal changes. The viscosity of the middle ear fluid should not affect the decision to place a myringotomy tube.

The type of myringotomy tubes used will vary with each surgeon's preference and experience. The Grommet tube, which is commonly used, has the advantage of spontaneous extrusion after three to five months. A variety of wide-flanged tubes are available for long-term ventilation.

Adenoid hypertrophy is frequently associated with persistent nasopharyngeal suppuration⁶ and dysfunction of the eustachian tube. Accordingly, when adenoids are enlarged, adenoidectomy should be performed. Tonsillectomy should be reserved for children with a definite history of recurrent tonsillitis in association with middle ear disease. The benefits of adenoidectomy and myringotomy with the insertion of ventilating tubes must be weighed against the risks. General operative morbidity should approach

zero. Placement of myringotomy tubes does carry an incidence of persistent tympanic membrane perforation. Moreover, recurrent ear drainage can complicate the presence of a tube. Table III⁸ summarizes the incidence of complications of myringotomy tube placement.

CONCLUSION

In summary, a rational approach to the treatment of serous otitis media has evolved based upon an understanding of the basic pathophysiology of the disease. There are, however, few absolutes in the schema. Each clinician's judgement will reflect his past experience. The ultimate goal must be to relieve hearing loss and prevent chronic ear disease.

REFERENCES

1. *The Second International Symposium on Otitis Media with Effusion*, *Ann. Otolaryngol.* (Suppl.) 89:4-8, 1980.
2. Tos, M.: Production of mucous in the middle ear and Eustachian tube. *Ann. Otol. Rhinol. Laryngol.* 83 (Suppl. 11): 44-58, 1974.
3. Hentzer, I.: Ultrastructure of middle ear mucosa. *Ann. Otol. Rhinol. Laryngol.* 85 (Suppl. 25):30-35, 1976.
4. Fiellau, N. M., and Lous, J.: Prospective tympanometry in three year old children. *Arch. Otolaryngol.* 105:461-66, 1979.
5. Tos, M.: Spontaneous improvement of secretory otitis and impedance screening. *Arch. Otolaryngol.* 106:345-50, 1980.
6. Roukonen, J., Sandelin, K., and Makinen, J.: Adenoids and otitis media with effusion. *Ann. Otol. Rhinol. Laryngol.* 88:166-71, 1979.
7. Schwartz, R., Puglese, J., and Schwartz, D.: Short Course of Prednisone for Treating Middle Ear Effusion: A Double Blind Placebo Crossover Study. *Second International Symposium on Otitis Media with Effusion*. *Ann. Otolaryngol.* (Suppl.) 89: 290-95, 1980.
8. McLellan, C.: Incidence of complications from the use of tympanostomy tubes. *Arch. Otolaryngol.* 106:97-99, 1980.